What is claimed is:

1. A method of providing antenna diversity in a communications system that contains a transmission device that sends and receives a plurality of transmit and receive packets, respectively, at a single location, the transmission device including two antennas, the method comprising:

designating one antenna of the two antennas as a default antenna, wherein an antenna of the two antennas other than the antenna that is designated as the default antenna is an alternate antenna;

sending each transmit packet a first time using the default antenna as a transmit antenna, wherein for any transmit packet, the transmit antenna is whichever antenna of the at least two antennas is used to send the transmit packet;

listening for each receive packet that acknowledges a previously sent transmit packet using as a receive antenna the transmit antenna that was used to send the previously sent transmit packet, wherein for any receive packet, the receive antenna is whichever antenna of the at least two antennas is used to listen for the receive packet;

listening for all other receive packets using the default antenna as the receive antenna;

reversing which antenna of the two antennas is the default antenna and which antenna is the alternate antenna; and

using transmission and reception results from only one antenna of the two antennas to determine whether to reverse which of the two antennas is the default antenna.

2. The method of claim 1 further comprising:

changing the transmit antenna from the default antenna to the alternate antenna by switching between the two antennas.

3. The method of claim 2 wherein the transmission and reception results from only one antenna of the two antennas are used to determine whether to switch between the two antennas.

4. A method of providing antenna diversity in a communications system that contains a transmission device that sends and receives a plurality of transmit and receive packets, respectively, at a single location, the transmission device including two antennas, the method comprising:

designating one antenna of the two antennas as a default antenna and the other antenna of the two antennas as an alternate antenna;

redesignating the default antenna and the alternate antenna, by changing which antenna of the two antennas is designated as the default antenna and which antenna is designated as the alternate antenna;

sending each transmit packet that acknowledges a previously received receive unicast packet using whichever antenna was used to receive the previously received receive unicast packet;

sending all other transmit packets a first time using the default antenna;

listening for each receive packet that acknowledges a previously sent transmit packet using whichever antenna was used to send the previously sent transmit packet;

listening for all other receive packets using the default antenna; and

for any transmit unicast packet, using the alternate antenna to send the transmit unicast packet to a destination after a number of unsuccessful sends of the transmit unicast packet using the default antenna.

5. The method of claim 4 wherein the number of unsuccessful sends is two.

6. The method of claim 4 wherein an unsuccessful send of the transmit unicast packet comprises not receiving any receive packet that acknowledges the transmit unicast packet.

7. The method of claim 4 wherein a transmit management interface is configured to redesignate the default antenna and the alternate antenna.

8. The method of claim 4 further comprising:

for any transmit packet, redesignating the default antenna and the alternate antenna in accordance with a transmit descriptor of the transmit packet.

9. The method of claim 4 further comprising:

for any transmit unicast packet, redesignating the default antenna and the alternate antenna so that the default antenna is whichever antenna of the two antennas that most recently sent the transmit unicast packet and that received any receive packet that acknowledges the transmit unicast packet.

10. A method of providing antenna diversity in a communications system that contains a transmission device that sends and receives a plurality of transmit and receive packets, respectively, at a single location, the transmission device including at least two antennas, the method comprising:

designating one antenna of the at least two antennas as a default antenna;

sending each transmit packet that acknowledges a previously received receive unicast packet using whichever antenna was used to receive the previously received receive unicast packet;

sending all other transmit packets a first time using the default antenna;

listening for each receive packet that acknowledges a previously sent transmit packet using whichever antenna was used to send the previously sent transmit packet;

listening for all other receive packets using the default antenna; and

for any transmit unicast packet, sending the transmit unicast packet on an antenna of the at least two antennas other than that antenna that is designated as the default antenna if the transmit unicast packet is not successfully transmitted by the default antenna after one or more attempts to send the transmit unicast packet.

11. The method of claim 10 further comprising:

sending a transmit clear to send (CTS) packet in response to a receive request to send (RTS) packet using whichever antenna of the at least two antennas was just used to receive the receive RTS packet.

12. The method of claim 11 further comprising:

listening for a packet in response to the transmit CTS packet using whichever antenna of the at least two antennas was just used to send the transmit CTS packet.

13. A method of providing antenna diversity in a communications system that contains a transmission device that sends and receives a plurality of transmit and receive packets, respectively, at a single location, the transmission device including at least two antennas, the method comprising:

designating one antenna of the at least two antennas as a default antenna, wherein an antenna of the at least two antennas other than the antenna that is designated as the default antenna is an alternate antenna;

sending each transmit packet a first time using the default antenna;

listening for each receive packet that acknowledges a previously sent transmit packet using whichever antenna of the at least two antennas was used to send the previously sent transmit packet;

listening for all other receive packets using the default antenna;

resending any transmit packet that was not successfully transmitted using one of the default antenna and the alternate antenna, until any such transmit packet is successfully transmitted or until a predetermined number of resends is reached; and

changing the default antenna between the at least two antennas in response to predetermined criteria that take into account which antenna successfully transmitted any transmit packet during the step of resending such that once the default antenna is changed, both the sending and listening steps will send and receive, respectively, using the changed default antenna.

14. An antenna diversity system, comprising:

a plurality of mobile stations;

an access point, the access point sending and receiving a plurality of transmit and receive packets, respectively, at a single location, the access point configured to communicate with the mobile stations via the transmit and receive packets, the access point comprising:

at least two antennas, wherein for any transmit packet, a transmit antenna is whichever antenna of the at least two antennas is used to send the transmit packet; and wherein for any receive packet, a receive antenna is whichever antenna of the at least two antennas is used to listen for the receive packet;

a switch to change between the at least two antennas; and

a transmit management interface to direct the switch, to designate one antenna of the at least two antennas as a default antenna, and to change which antenna of the at least two antennas is the default antenna in response to predetermined criteria that take into account the success of the transmit antenna in transmission of transmit packets and the success of the receive antenna in reception of receive packets, wherein an antenna of the at least two antennas other than the antenna that is designated as the default antenna is an alternate antenna, and wherein the default antenna is used as the transmit antenna to send each transmit unicast packet a first time and to send each transmit broadcast packet, and wherein the transmit antenna that was used to send a previously sent transmit packet is used as the receive antenna to listen for each receive packet that acknowledges the previously sent transmit packet, and wherein the default antenna is used as the receive antenna to listen for all other receive packets, and wherein for any transmit unicast packet, the alternate antenna is used to send the transmit unicast packet if the transmit unicast packet is not successfully transmitted by the default antenna after one or more attempts.

15. The system of claim 14 wherein the access point comprises an IEEE 802.11a compliant wireless access point device.

16. The system of claim 14 wherein the mobile stations comprise IEEE 802.11a compliant wireless mobile station devices.

17. An antenna diversity system, comprising:

an access point;

a mobile station, the mobile station sending and receiving a plurality of transmit and receive packets, respectively, at a single location, the mobile station configured to communicate with the access point via the transmit and receive packets, the mobile station comprising:

at least two antennas, wherein for any transmit packet, a transmit antenna is whichever antenna of the at least two antennas is used to send the transmit packet to the access point; and wherein for any receive packet, a receive antenna is whichever antenna of the at least two antennas is used to listen for the receive packet from the access point;

a switch to change between the at least two antennas; and

a transmit management interface to direct the switch, to designate one antenna of the at least two antennas as a default antenna, and to change which antenna of the at least two antennas is the default antenna in response to predetermined criteria that take into account the success of the transmit antenna in transmission of transmit packets and the success of the receive antenna in reception of receive packets, wherein an antenna of the at least two antennas

other than the antenna that is designated as the default antenna is an alternate antenna, and wherein the default antenna is used as the transmit antenna to send each transmit unicast packet a first time, and wherein the transmit antenna that was used to send a previously sent transmit packet is used as the receive antenna to listen for each receive packet that acknowledges the previously sent transmit packet, and wherein the default antenna is used as the receive antenna to listen for all other receive packets, and wherein for any transmit unicast packet, the alternate antenna is used to send the transmit unicast packet if the transmit unicast packet is not successfully transmitted by the default antenna after one or more attempts.

18. The system of claim 17 wherein the mobile station comprises an IEEE 802.11a compliant wireless mobile station device.

19. The system of claim 17 wherein the access point comprises an IEEE 802.11a compliant wireless access point device.

20. An antenna diversity system, comprising:

a plurality of mobile stations in an ad hoc network;

a first mobile station in the ad hoc network, the first mobile station sending and receiving a plurality of transmit and receive packets, respectively, at a single location, the first mobile station configured to communicate with the mobile stations via the transmit and receive packets, the first mobile station comprising:

at least two antennas, wherein for any transmit packet, a transmit antenna is whichever antenna of the at least two antennas is used to send the transmit

packet; and wherein for any receive packet, a receive antenna is whichever antenna of the at least two antennas is used to listen for the receive packet;

a switch to change between the at least two antennas; and

a transmit management interface to direct the switch, to designate one antenna of the at least two antennas as a broadcast default antenna and one antenna of the at least two antennas as a destination default antenna, and to change which antenna of the at least two antennas is the broadcast default antenna in response to predetermined criteria that take into account the success of the transmit antenna in transmission of transmit packets and the success of the receive antenna in reception of receive packets, wherein the destination default antenna and the broadcast default antenna are not necessarily the same antenna of the at least two antennas, and wherein an antenna of the at least two antennas other than the antenna that is designated as the destination default antenna is a destination alternate antenna, and wherein the destination default antenna is used as the transmit antenna to send each transmit unicast packet a first time, and wherein the broadcast default antenna is used as the transmit antenna to send each transmit broadcast packet, and wherein the transmit antenna that was used to send a previously sent transmit packet is used as the receive antenna to listen for each receive packet that acknowledges the previously sent transmit packet, and wherein the broadcast default antenna is used as the receive antenna to listen for all other receive packets, and wherein for any transmit unicast packet, the destination alternate

antenna is used to send the transmit unicast packet if the transmit unicast packet is not successfully transmitted by the destination default antenna after one or more attempts.

21. The system of claim 20 wherein the first mobile station and the mobile stations comprise IEEE 802.11a compliant wireless mobile station devices.

22. A method of providing antenna diversity in a communications system that contains a transmission device that sends and receives a plurality of transmit and receive packets, respectively, at a single location, the transmission device including at least two antennas, the method comprising:

designating one antenna of the at least two antennas as a default antenna, wherein an antenna of the at least two antennas other than the antenna that is designated as the default antenna is an alternate antenna;

sending each transmit packet a first time using the default antenna as a transmit antenna, wherein for any transmit packet, the transmit antenna is whichever antenna of the at least two antennas is used to send the transmit packet;

listening for each receive packet that acknowledges a previously sent transmit packet using as a receive antenna the transmit antenna that was used to send the previously sent transmit packet, wherein for any receive packet, the receive antenna is whichever antenna of the at least two antennas is used to listen for the receive packet;

listening for all other receive packets using the default antenna as the receive antenna;

for any transmit unicast packet, sending the transmit unicast packet on the alternate antenna if the transmit unicast packet is not successfully transmitted by the default antenna after one or more attempts; and

changing which antenna of the at least two antennas is the default antenna in response to predetermined criteria that take into account the success of the transmit antenna in transmission of transmit packets and the success of the receive antenna in reception of receive packets.

23. The method of claim 22 further comprising:

changing the transmit antenna by switching between the at least two antennas.

24. The method of claim 22 further comprising:

changing the receive antenna by switching between the at least two antennas.

25. The method of claim 23 further comprising:

changing the receive antenna by switching between the at least two antennas.

26. The method of claim 25 further comprising:

examining, for a single antenna of the at least two antennas, the success in transmission of transmit packets of the single antenna to determine whether to switch between the at least two antennas.

27. The method of claim 22 further comprising:

examining, for a single antenna of the at least two antennas, the success in transmission of transmit packets of the single antenna to determine whether to change which of the at least two antennas is the default antenna.

28. The method of claim 25 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to switch between the at least two antennas.

29. The method of claim 22 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to change which of the at least two antennas is the default antenna.

30. The method of claim 22 wherein the communications system is an IEEE 802.11a compliant wireless LAN.

31. The method of claim 22 wherein the packets are modulated and demodulated according to orthogonal frequency division multiplexing (OFDM).

32. The method of claim 22 further comprising:

changing which of the at least two antennas is designated as the default antenna responsively to software processes, wherein the software processes learn which antenna of the at least two antennas is best able to transmit the transmit packets and to receive the receive packets by examining transmission and reception results of the antennas over the long-term.

33. The method of claim 22 further comprising:

changing which of the at least two antennas is designated as the default antenna responsively to hardware processes.

34. The method of claim 33 wherein the hardware processes are dependent on short-term results of sends of transmit packets.

35. The method of claim 23 wherein the transmit antenna is changed responsively to hardware processes.

36. The method of claim 23 wherein the transmit antenna is changed responsively to the short-term results of sends of packets.

37. The method of claim 24 wherein the receive antenna is changed responsively to hardware processes.

38. The method of claim 24 wherein the receive antenna is changed responsively to the short-term results of sends of packets.

39. The method of claim 23 further comprising:

for any transmit unicast packet, changing the transmit antenna after successive unsuccessful resends of the transmit unicast packet.

40. The method of claim 23 further comprising:

for any transmit unicast packet, changing the transmit antenna after every other unsuccessful resend of the transmit unicast packet.

41. The method of claim 23 further comprising:

for any transmit unicast packet, changing the transmit antenna after a number of unsuccessful sends of the transmit unicast packet.

42. The method of claim 23 further comprising:

for any transmit unicast packet, changing the transmit antenna from the default antenna to the alternate antenna after a number of unsuccessful sends of the transmit unicast packet.

43. The method of claim 42 wherein the number is adjusted prior to sending the transmit unicast packet a first time based on an expected collision rate in the communications system.

44. The method of claim 42 wherein the number is adjusted prior to sending the transmit unicast packet a first time based on an expected overall load rate of the communications system.

45. The method of claim 22 further comprising:

following a time period, changing which of the at least two antennas is designated as the default antenna if no receive packets have been successfully received over the time period.

46. The method of claim 45 further comprising:

comparing a running value of a timer to a value of the time period to assess whether or not the time period has elapsed; and

initializing the timer if any receive packet is received successfully.

47. The method of claim 22 further comprising:

for any successfully received receive unicast packet, sending a transmit packet that acknowledges the receive unicast packet using as the transmit antenna the receive antenna that was used to receive the receive unicast packet.

48. The method of claim 23 further comprising:

for any transmit unicast packet, changing the transmit antenna if no receive packets that acknowledge the transmit unicast packet are received in response to successive resends of the transmit unicast packet.

49. The method of claim 23 further comprising:

for any transmit unicast packet, changing the transmit antenna if no receive packets that acknowledge the transmit unicast packet are received in response to two sends of the transmit unicast packet.

50. The method of claim 23 further comprising:

for any transmit unicast packet, changing the transmit antenna on every other send of the transmit unicast packet until an overall number of sends of the transmit unicast packet is reached or until a receive packet that acknowledges the transmit unicast packet is received.

51. The method of claim 22 further comprising:

for any transmit unicast packet, attempting to send the transmit unicast packet twice on each antenna of the at least two antennas, beginning with the default antenna, until an overall number of sends of the transmit unicast packet is reached or until a receive packet that acknowledges the transmit unicast packet is received.

52. The method of claim 51 further comprising:

if no receive packets that acknowledge the transmit unicast packet are received in response to the sends of the transmit unicast packet, then

aborting transmission of the transmit unicast packet.

53. The method of claim 51 further comprising:

if no receive packets that acknowledge the transmit unicast packet are received in response to the sends of the transmit unicast packet, then

aborting transmission of the transmit unicast packet;

attempting to send the transmit unicast packet at a lower data rate; and

maintaining the present default antenna designation.

54. The method of claim 51 further comprising:

if any receive packet that acknowledges the transmit unicast packet is received in response to a send of the transmit unicast packet, then

if the receive packet that acknowledges the transmit unicast packet is received by the default antenna, then

maintaining the present default antenna designation; and

otherwise, then

changing which antenna of the at least two antennas is designated as the default antenna to whichever antenna of the at least two antennas received the receive packet that acknowledges the transmit unicast packet.

55. The method of claim 51 further comprising:

if any receive packet that acknowledges the transmit unicast packet is received in response to a send of the transmit unicast packet, then

maintaining the present default antenna designation.

56. A method of providing antenna diversity in a communications system that contains an access point that sends and receives a plurality of transmit and receive packets, respectively, at a single location, the access point configured to communicate with a plurality of mobile stations via the transmit and receive packets, the access point including at least two antennas, the method comprising:

designating one antenna of the at least two antennas as a default antenna, wherein an antenna of the at least two antennas other than the antenna that is designated as the default antenna is an alternate antenna;

sending each transmit unicast packet a first time using the default antenna as a transmit antenna, wherein for any transmit packet, the transmit antenna is whichever antenna of the at least two antennas is used to send the transmit packet;

sending each transmit broadcast packet using the default antenna as the transmit antenna;

listening for each receive packet that acknowledges a previously sent transmit packet using as a receive antenna the transmit antenna that was used to send the previously sent transmit packet, wherein for any receive packet, the receive antenna is whichever antenna of the at least two antennas is used to listen for the receive packet;

listening for all other receive packets using the default antenna as the receive antenna;

for any transmit unicast packet, sending the transmit unicast packet on the alternate antenna if the transmit unicast packet is not successfully transmitted by the default antenna after one or more attempts; and

changing which antenna of the at least two antennas is the default antenna in response to predetermined criteria that take into account the success of the transmit antenna in transmission of transmit packets and the success of the receive antenna in reception of receive packets.

57. The method of claim 56 further comprising:

changing the transmit antenna by switching between the at least two antennas.

58. The method of claim 56 further comprising:

changing the receive antenna by switching between the at least two antennas.

59. The method of claim 57 further comprising:

changing the receive antenna by switching between the at least two antennas.

60. The method of claim 59 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to switch between the at least two antennas.

61. The method of claim 56 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to change which of the at least two antennas is the default antenna.

62. The method of claim 57 further comprising:

for any transmit unicast packet, changing the transmit antenna after every other unsuccessful resend of the transmit unicast packet.

63. The method of claim 57 further comprising:

for any transmit unicast packet, changing the transmit antenna from the default antenna to the alternate antenna after a number of unsuccessful sends of the transmit unicast packet.

64. The method of claim 56 further comprising:

changing which of the at least two antennas is designated as the default antenna responsively to software processes, wherein the software processes learn which

antenna of the at least two antennas is best able to transmit the transmit packets and to receive the receive packets by examining transmission and reception results of the antennas over the long-term.

65. The method of claim 56 further comprising:

following a time period, changing which of the at least two antennas is designated as the default antenna if no receive packets have been successfully received over the time period.

66. The method of claim 65 further comprising:

comparing a running value of a timer to a value of the time period to assess whether or not the time period has elapsed; and

initializing the timer if any receive packet is received successfully.

67. The method of claim 56 further comprising:

for any successfully received receive unicast packet, sending a transmit packet that acknowledges the receive unicast packet using as the transmit antenna the receive antenna that was used to receive the receive unicast packet.

68. The method of claim 56 further comprising:

following a time period, changing which of the at least two antennas is designated as the default antenna if the access point determines that the transmit broadcast packets are not being received by the mobile stations over the time period.

69. The method of claim 56 wherein sending each transmit broadcast packet using the default antenna as the transmit antenna allows a first mobile station at another location, the first mobile station having at least two mobile station antennas, to learn which mobile station antenna of the

at least two mobile station antennas receives transmit broadcast packets effectively from the access point.

70. The method of claim 57 further comprising:

for any transmit unicast packet, changing the transmit antenna if no receive packets that acknowledge the transmit unicast packet are received in response to successive resends of the transmit unicast packet.

71. The method of claim 57 further comprising:

for any transmit unicast packet, changing the transmit antenna if no receive packets that acknowledge the transmit unicast packet are received in response to two sends of the transmit unicast packet.

72. The method of claim 57 further comprising:

for any transmit unicast packet, changing the transmit antenna on every other send of the transmit unicast packet until an overall number of sends of the transmit unicast packet is reached or until a receive packet that acknowledges the transmit unicast packet is received.

73. The method of claim 56 further comprising:

for any transmit unicast packet, attempting to send the transmit unicast packet twice on each antenna of the at least two antennas, beginning with the default antenna, until an overall number of sends of the transmit unicast packet is reached or until a receive packet that acknowledges the transmit unicast packet is received.

74. The method of claim 73 further comprising:

if no receive packets that acknowledge the transmit unicast packet are received in response to the sends of the transmit unicast packet, then

aborting transmission of the transmit unicast packet.

75. The method of claim 73 further comprising:

if no receive packets that acknowledge the transmit unicast packet are received in response to the sends of the transmit unicast packet, then

aborting transmission of the transmit unicast packet;

attempting to send the transmit unicast packet at a lower data rate; and

maintaining the present default antenna designation.

76. The method of claim 73 further comprising:

if any receive packet that acknowledges the transmit unicast packet is received in response to a send of the transmit unicast packet, then

maintaining the present default antenna designation.

77. A method of providing antenna diversity in a communications system that contains a mobile station that sends and receives a plurality of transmit and receive packets, respectively, at a single location, the mobile station configured to communicate with an access point via the transmit and receive packets, the mobile station including at least two antennas, the method comprising:

designating one antenna of the at least two antennas as a default antenna, wherein an antenna of the at least two antennas other than the antenna that is designated as the default antenna is an alternate antenna;

sending each transmit unicast packet a first time using the default antenna as a transmit antenna, wherein for any transmit packet, the transmit antenna is whichever antenna of the at least two antennas is used to send the transmit packet to the access point;

listening for each receive packet that acknowledges a previously sent transmit packet using as a receive antenna the transmit antenna that was used to send the previously sent transmit packet, wherein for any receive packet, the receive antenna is whichever antenna of the at least two antennas is used to listen for the receive packet from the access point;

listening for all other receive packets, using the default antenna as the receive antenna;

for any transmit unicast packet, sending the transmit unicast packet on the alternate antenna if the transmit unicast packet is not successfully transmitted by the default antenna after one or more attempts; and

changing which antenna of the at least two antennas is the default antenna in response to predetermined criteria that take into account the success of the transmit antenna in transmission of transmit packets and the success of the receive antenna in reception of receive packets.

78. The method of claim 77 further comprising:

changing the transmit antenna by switching between the at least two antennas.

79. The method of claim 77 further comprising:

changing the receive antenna by switching between the at least two antennas.

80. The method of claim 78 further comprising:

changing the receive antenna by switching between the at least two antennas.

81. The method of claim 80 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to switch between the at least two antennas.

82. The method of claim 77 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to change which of the at least two antennas is the default antenna.

83. The method of claim 77 further comprising:

changing which of the at least two antennas is designated as the default antenna responsively to hardware processes.

84. The method of claim 83 wherein the hardware processes are dependent on short-term results of sends of transmit unicast packets.

85. The method of claim 78 further comprising:

for any transmit unicast packet, changing the transmit antenna after every other unsuccessful resend of the transmit unicast packet.

86. The method of claim 78 further comprising:

for any transmit unicast packet, changing the transmit antenna from the default antenna to the alternate antenna after a number of unsuccessful sends of the transmit unicast packet.

87. The method of claim 77 further comprising:

following a time period, changing which of the at least two antennas is designated as the default antenna if no receive packets have been successfully received over the time period.

88. The method of claim 87 further comprising:

comparing a running value of a timer to a value of the time period to assess whether or not the time period has elapsed; and

initializing the timer if any receive packet is received successfully.

89. The method of claim 77 further comprising:

changing which of the at least two antennas is designated as the default antenna if two consecutive receive broadcast packets have been received with errors.

90. The method of claim 77 wherein the receive packets include receive broadcast packets that respectively comprise receive beacon packets.

91. The method of claim 90 further comprising:

changing which of the at least two antennas is designated as the default antenna if two consecutive receive beacon packets have been missed based on the expected time of arrival of the receive beacon packets from the access point.

92. The method of claim 77 further comprising:

following a time period, changing which of the at least two antennas is designated as the default antenna if no receive broadcast packets have been received for a duration of the time period.

93. The method of claim 77 further comprising:

for any successfully received receive unicast packet, sending a transmit packet that acknowledges the receive unicast packet using as the transmit antenna the receive antenna that was used to receive the receive unicast packet.

94. The method of claim 77 further comprising:

changing which of the at least two antennas is designated as the default antenna responsively to the short-term results of sends of transmit unicast packets.

95. The method of claim 78 further comprising:

for any transmit unicast packet, changing the transmit antenna if no receive packets that acknowledge the transmit unicast packet are received in response to successive resends of the transmit unicast packet.

96. The method of claim 78 further comprising:

for any transmit unicast packet, changing the transmit antenna if no receive packets that acknowledge the transmit unicast packet are received in response to two sends of the transmit unicast packet.

97. The method of claim 78 further comprising:

for any transmit unicast packet, changing the transmit antenna on every other send of the transmit unicast packet until an overall number of sends of the transmit unicast packet is reached or until a receive packet that acknowledges the transmit unicast packet is received.

98. The method of claim 77 further comprising:

for any transmit unicast packet, attempting to send the transmit unicast packet twice on each antenna of the at least two antennas, beginning with the default antenna, until

an overall number of sends of the transmit unicast packet is reached or until a receive packet that acknowledges the transmit unicast packet is received.

99. The method of claim 98 further comprising:

if no receive packets that acknowledge the transmit unicast packet are received in response to the sends of the transmit unicast packet, then

aborting transmission of the transmit unicast packet.

100. The method of claim 99 further comprising:

if no receive packets that acknowledge the transmit unicast packet are received in response to the sends of the transmit unicast packet, then

aborting transmission of the transmit unicast packet;

attempting to send the transmit unicast packet at a lower data rate; and

maintaining the present default antenna designation.

101. The method of claim 99 further comprising:

if any receive packet that acknowledges the transmit unicast packet is received in response to a send of the transmit unicast packet, then

if the receive packet that acknowledges the transmit unicast packet is received by the default antenna, then

maintaining the present default antenna designation; and

otherwise, then

changing which antenna of the at least two antennas is designated as the default antenna to whichever antenna of the at least two antennas

received the receive packet that acknowledges the transmit unicast packet.

102. The method of claim 77 further comprising:

changing which of the at least two antennas is designated as the default antenna to whichever antenna of the at least two antennas is most recently successful in transmission.

103. The method of claim 102 wherein whichever antenna of the at least two antennas is most recently successful in transmission comprises whichever antenna of the at least two antennas most recently successfully received any receive packet that acknowledges a previously sent transmit unicast packet.

104. The method of claim 77 further comprising:

changing which of the at least two antennas is designated as the default antenna to whichever antenna of the at least two antennas is most recently successful in reception.

105. The method of claim 104 wherein whichever antenna of the at least two antennas is most recently successful in reception comprises whichever antenna of the at least two antennas most recently successfully received a receive packet from the access point.

106. A method of providing antenna diversity in a communications system that contains a transmission device that sends and receives a plurality of transmit and receive packets, respectively, at a single location, the transmission device configured to communicate with a plurality of destination transmission devices via the transmit and receive packets, the transmission device including at least two antennas, the method comprising:

designating one antenna of the at least two antennas as a broadcast default antenna;

designating one antenna of the at least two antennas as a destination default antenna, wherein the destination default antenna and the broadcast default antenna are not necessarily the same antenna of the at least two antennas;

sending each transmit unicast packet a first time using the destination default antenna as a transmit antenna, wherein for any transmit packet, the transmit antenna is whichever antenna of the at least two antennas is used to send the transmit packet, wherein an antenna of the at least two antennas other than the antenna that is designated as the destination default antenna is a destination alternate antenna;

sending each transmit broadcast packet using the broadcast default antenna as the transmit antenna;

listening for each receive packet that acknowledges a previously sent transmit packet using as a receive antenna the transmit antenna that was used to send the previously sent transmit packet, wherein for any receive packet, the receive antenna is whichever antenna of the at least two antennas is used to listen for the receive packet;

listening for all other receive packets using the broadcast default antenna as the receive antenna;

for any transmit unicast packet, sending the transmit unicast packet on the destination alternate antenna if the transmit unicast packet is not successfully transmitted by the destination default antenna after one or more attempts; and

changing which antenna of the at least two antennas is the broadcast default antenna in response to predetermined criteria that take into account the success of the transmit antenna in transmission of transmit packets and the success of the receive antenna in reception of receive packets.

107. The method of claim 106 further comprising:

changing the transmit antenna by switching between the at least two antennas.

108. The method of claim 106 further comprising:

changing the receive antenna by switching between the at least two antennas.

109. The method of claim 107 further comprising:

changing the receive antenna by switching between the at least two antennas.

110. The method of claim 109 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to switch between the at least two antennas.

111. The method of claim 106 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to change which of the at least two antennas is the broadcast default antenna.

112. The method of claim 106 further comprising:

examining, for a single antenna of the at least two antennas, the success in reception of receive packets of the single antenna to determine whether to change which of the at least two antennas is the destination default antenna.

113. The method of claim 106 further comprising:

changing which antenna of the at least two antennas is the destination default antenna in response to the predetermined criteria.

114. The method of claim 106 wherein the transmission device comprises a mobile station.

115. The method of claim 114 wherein the each destination transmission device respectively comprises a destination mobile station.

116. The method of claim 114 wherein the communications system is an ad hoc network.

117. The method of claim 106 further comprising:

changing which of the at least two antennas is designated as the broadcast default antenna responsively to hardware processes.

118. The method of claim 106 further comprising:

changing which of the at least two antennas is designated as the destination default antenna responsively to hardware processes.

119. The method of claim 118 wherein the hardware processes are dependent on short-term results of sends of transmit unicast packets.

120. The method of claim 107 further comprising:

for any transmit unicast packet, changing the transmit antenna after every other unsuccessful resend of the transmit unicast packet.

121. The method of claim 107 further comprising:

for any transmit unicast packet, changing the transmit antenna from the destination default antenna to the destination alternate antenna after a number of unsuccessful sends of the transmit unicast packet.

122. The method of claim 106 further comprising:

changing which of the at least two antennas is designated as the broadcast default antenna responsively to software processes, wherein the software processes learn which antenna of the at least two antennas is best able to transmit the transmit packets and to receive the receive packets by examining transmission and reception results of the antennas over the long-term.

123. The method of claim 106 further comprising:

following a time period, changing which of the at least two antennas is designated as the broadcast default antenna if no receive packets have been successfully received over the time period.

124. The method of claim 123 further comprising:

comparing a running value of a timer to a value of the time period to assess whether or not the time period has elapsed; and

initializing the timer if any receive packet is received successfully.

125. The method of claim 106 further comprising:

changing which of the at least two antennas is designated as the broadcast default antenna if two consecutive receive broadcast packets have been received with errors.

126. The method of claim 106 wherein the receive packets include receive broadcast packets that respectively comprise receive beacon packets.

127. The method of claim 126 further comprising:

changing which of the at least two antennas is designated as the broadcast default antenna if two consecutive receive beacon packets have been missed based on the expected

time of arrival of the receive beacon packets from the destination transmission devices.

128. The method of claim 106 further comprising:

following a time period, changing which of the at least two antennas is designated as the broadcast default antenna if no receive broadcast packets have been received for a duration of the time period.

129. The method of claim 106 further comprising:

for any successfully received receive unicast packet, sending a transmit packet that acknowledges the receive unicast packet using as the transmit antenna the receive antenna that was used to receive the receive unicast packet.

130. The method of claim 106 further comprising:

following a time period, changing which of the at least two antennas is designated as the broadcast default antenna if the transmission device determines that the transmit broadcast packets are not being received by the destination transmission devices over the time period.

131. The method of claim 106 further comprising:

following a time period, changing which of the at least two antennas is designated as the broadcast default antenna if a number of receive unicast packets have been received with errors from the destination transmission devices over the time period.

132. The method of claim 106 wherein sending each transmit broadcast packet using the broadcast default antenna as the transmit antenna allows a first destination transmission device at another location, the first destination transmission device having at least two destination

antennas, to learn which destination antenna of the at least two destination receives transmit broadcast packets effectively from the transmission device.

133. The method of claim 106 further comprising:

changing which of the at least two antennas is designated as the destination default antenna responsively to the short-term results of sends of transmit unicast packets.

134. The method of claim 107 further comprising:

for any transmit unicast packet, changing the transmit antenna if no receive packets that acknowledge the transmit unicast packet are received in response to successive resends of the transmit unicast packet.

135. The method of claim 107 further comprising:

for any transmit unicast packet, changing the transmit antenna if no receive packets that acknowledge the transmit unicast packet are received in response to two sends of the transmit unicast packet.

136. The method of claim 107 further comprising:

for any transmit unicast packet, changing the transmit antenna on every other send of the transmit unicast packet until an overall number of sends of the transmit unicast packet is reached or until a receive packet that acknowledges the transmit unicast packet is received.

137. The method of claim 106 further comprising:

for any transmit unicast packet to be sent to one destination transmission device of the destination transmission devices, attempting to send the transmit unicast packet twice on each antenna of the at least two antennas, beginning with the destination default

antenna, until an overall number of sends of the transmit unicast packet is reached or until a receive packet that acknowledges the transmit unicast packet is received.

138. The method of claim 137 further comprising:

if no receive packets that acknowledge the transmit unicast packet are received in response to the sends of the transmit unicast packet, then

aborting transmission of the transmit unicast packet.

139. The method of claim 137 further comprising:

if any receive packet that acknowledges the transmit unicast packet is received in response to a send of the transmit unicast packet, then

using whichever antenna of the at least two antennas received the receive packet that acknowledges the transmit unicast packet as the destination default antenna the first time that any subsequent transmit unicast packet is sent to the one destination transmission device.

140. The method of claim 106 further comprising:

for sending transmit packets to any one destination transmission device, changing which of the at least two antennas is designated as the destination default antenna to whichever antenna of the at least two antennas is most recently successful in transmission to the destination transmission device.

141. The method of claim 140 wherein whichever antenna of the at least two antennas is most recently successful in transmission comprises whichever antenna of the at least two antennas most recently successfully received any receive packet from the destination transmission device that acknowledges a previously sent transmit unicast packet.

142. The method of claim 106 further comprising:

for sending transmit packets to any one destination transmission device, changing which of the at least two antennas is designated as the destination default antenna to whichever antenna of the at least two antennas is most recently successful in reception from the destination transmission device.

143. The method of claim 142 wherein whichever antenna of the at least two antennas is most recently successful in reception comprises whichever antenna of the at least two antennas most recently successfully received a receive packet from the destination transmission device.

144. The method of claim 106 further comprising:

for any destination transmission device of the destination transmission devices, identifying a corresponding individual antenna of the at least two antennas that is empirically known to communicate successfully with the destination transmission device.

145. The method of claim 144 further comprising:

changing which of the at least two antennas is designated as the destination default antenna based on the individual antenna and the destination transmission device.

146. The method of claim 144 further comprising:

for all individual antennas and destination transmission devices, creating an antenna table of the individual antennas and consulting the table to change which of the at least two antennas is designated as the destination default antenna for each respective destination transmission device.

147. The method of claim 144 further comprising:

for all individual antennas and destination transmission devices, creating an antenna table of the individual antennas and consulting the table to change the transmit antenna for each respective destination transmission device.

148. The method of claim 106 further comprising:

creating a table that indicates, for any destination transmission device, which antenna of the at least two antennas has been most recently successful in communicating with the destination transmission device via transmit unicast packets.

149. The method of claim 148, wherein the table is created by a software process.